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AN EXPEDITION TO THE SALVAGE ISLANDS.

By Hon. Cecil Baring and W. R. Ogilvie Grant.*

Few probably are aware of the existence of the Salvage Islands,† a small uninhabited group, situated, roughly speaking, between Madeira and the Canaries, and about 160 miles distant from the former, and eighty-five from Teneriffe.

According to the description given of them in the 'North Atlantic Memoir,' "the Salvages consist of an island named the Ilha Grande, or the Great Salvage, a larger island named Great Piton, and a smaller one called the Little Piton, together with several rocks. The Great Salvage lies in lat. 30° 8′, long. 15° 55′. It is of very irregular shape, and has a number of rocks about it within the distance of a mile. It is much intersected, and has several deep inlets, the most accessible of which is on the east side. It is covered with bushes, amongst which the thousands of sea-fowl make their nests. It is surrounded on all sides with dangers, most of which show, but many require all caution in approaching.

"The Great Piton lies at the distance of eight and a quarter miles W.S.W., three-quarters W., from Ilha Grande. This islet is two and three-eighths miles long, and has a hill or peak near the centre. The Little Piton lies at a mile from the western side

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† From the Spanish, *Selvajes—i.e.* desert islands.

of the former, and is three-quarters of a mile long; both are comparatively narrow. These isles are seated upon and surrounded by one dangerous rocky bank, which extends from the western side of the little isle half a league to the westward. . . The southern part of the Great Piton appears green, its northern part barren. It may be seen five or six leagues off. The Little Piton is very flat, and is connected to the south point of the greater one by a continued ledge of rocks. The whole of the eastern side of the Great Piton is rocky and dangerous."

These islands were visited so recently as 1889 by Mr. E. F. Knight, who, in his book, 'The Cruise of the Alerte,' has given a description of them, excellent from the seaman's point of view, but incomplete from that of the naturalist. Although the Admiralty chart gives the coasts and shoals of the Great Salvage very correctly, since this was prepared great changes must have taken place at the Pitons or southern islands, and this part of the chart is now far from correct. There can be no doubt that the sea has made great encroachments on the land, for the Great Piton cannot now be more than a mile and a half long, including the outlying rocks which are connected with the mainland at low water. Great Salvage is at the present time by far the largest of the three, its steep, rocky coast having defied the fury of the Atlantic.

Our object in visiting the Salvages was to ascertain what features of interest the flora and fauna presented. The flora of the Great Salvage had already been described by Lowe in a little pamphlet entitled 'Florulæ Salvagicæ Tentamen, or a List of Plants collected in the Salvages or Salvage Islands,' but he never visited these islands himself, the whole of his material having been obtained through the Portuguese fishermen, who every autumn frequent these islands as a fishing station, catching at the same time enormous numbers of the young of the Great Shearwater (*Puffinus kuhli*), which are there in thousands, and valuable for their oil and feathers. By going in the early part of the year we hoped to find many plants in flower which Lowe had not obtained, and were not disappointed. We took ship, accordingly, for Madeira, and landed at Funchal on April 10th, after a splendid passage on the 'Tantallon Castle,' the largest and one of the best equipped ships of the Castle line. Nor must we pass over this part of our journey without expressing our

appreciatien of the splendid management and extreme comfort on board the boats of this line, and the general excellence of all their internal arrangements. Our baggage, necessarily bulky, as it comprised tents, bedding, a large amount of collecting-gear, and many gallons of spirit, was taken the greatest care of, and nothing could exceed the kindness and civility of the officers, though we must have given them a considerable amount of extra trouble. Finding it impossible to procure a craft suitable to our purpose at Madeira, and being obliged to remain there for a week, we paid a flying visit to the islands of Porto Santo, which lie about thirty miles to the north-west, and obtained some interesting zoological specimens of all kinds. The Little Shearwater (*Puffinus assimilis*) was breeding on the Lime Island, and several nestlings in various stages of downy plumage were obtained, the larger ones appearing nearly twice as big as their parents. Like the young of all petrels, the bodies of these birds are thickly coated with a layer of yellow fat, and the skins require to be very carefully cleaned and prepared.

Among the birds obtained was a Kestrel, and being curious to ascertain what she had been preying on, we opened the stomach and found that it contained nothing but seven snail shells (*Helix pisana*) which had been swallowed whole! Curious diet for a bird of prey. As we traversed the fields of growing crops, the note of the Quail was constantly heard, and here and there we accidentally flushed one after nearly walking on to it, but it is almost hopeless looking for these birds without dogs. There were numerous flocks of Schimper's Rock Dove (*Columba schimperi*), which were rather wild and difficult to approach, as they are constantly pursued and shot at by the native gunners. This species much resembles the common Stock Dove in general appearance, having the rump grey like the back, but the general colour of the upper parts is altogether much paler, and there are two black bands across the wings, as in the Rock Dove. The small birds, though fairly numerous, belonged to few species, the commonest being Pipits (*Anthus bertheloti*), Rock Sparrows, and Linnets, while a few Canaries, Swifts, Swallows, &c., were observed. A fine series of the peculiar land snail (*Helix nivosa*) was collected, the species being apparently extremely local, and said to be only obtained at the base of the western rocky point where we met with them. Of spiders, the largest on the island is the Tarantula (*Lycosa made-*

riana), which is to be found on the higher stony ground, and with its shining green eyes, powerful jaws, and hairy, tawny-coloured legs, is altogether a most wicked-looking monster. Like the rest of its genus, it makes little or no web, and lives a secluded life beneath some particular stone, surrounded by the empty shells of numerous small land snails (*Helix paupercula*), which apparently form its principal food. With its powerful jaws it makes a hole in the side of the shell, and gradually sucks out the mollusc, and this diet is varied with millipeds and small isopodous crustacea, its nest being surrounded by their chitinous remains. The Portuguese are very much afraid of these large spiders, and no doubt with good reason, for they must be capable of inflicting a severe and most poisonous bite; but there is another much smaller black species (*Latrodectus* 13-*guttatus*) with a diminutive head and much swollen and rounded abdomen, like a black currant, which is held in much greater dread. The fangs are so small that it appears a most harmless insect, and it has frequently been handled by one of the writers with perfect impunity; but all the same, we have been since informed on the best authority that it can not only bite but is extremely poisonous. Porto Santo would be a most delightful place to spend a week or so, and we greatly regretted that an outbreak of smallpox prevented our returning there again in May to make a much more complete examination of this and the other rocky islets of the group. There is fair accommodation to be had in the little fishing village, but it would undoubtedly be very much pleasanter and more comfortable to take one's own tenting-gear and camp out. Those who are fond of sea fishing would find plenty of amusement.

A week after our arrival at Madeira we sailed for the Canaries, and found ourselves early on April 19th in the port of Santa Cruz (Teneriffe), a bright sun shining, and our spirits, which had been somewhat damped by the failure of our plans at Madeira, and by the continuously bad weather which we had experienced so far, correspondingly elated. Our steamer waited here till midnight, so we drove up to Laguna, and spent a pleasant day strolling about the green lanes in the immediate vicinity of that village, a place too well known to need detailed description here. There was no lack of bird life. On the way up we saw many Swifts and Pipits, Ravens, Kestrels, Kites, and Hoopoes, and near Laguna, Canaries, Common Buntings, Blackcaps, Spectacled Warblers,

Chiff-chaffs, Tits, &c., were plentiful. The Spectacled Warblers had bred, and we saw several old birds with broods of young on the wing, some of which were preserved. As the ship did not sail till midnight, we had plenty of time to skin all our specimens on board, and early next morning found us at La Luz, the port of Las Palmas, a spot designed by nature to be fair, but greatly defiled by man, who has turned it into a coaling station for his ships, and stirred up in the making of his roads an unspeakable quantity of dust.

At Las Palmas we were most kindly received by Mr. Richard Blandy and Mr. A. Doorley, to whose energetic and well-timed assistance we are largely indebted for the ultimate attainment of the object we had in view. Through the instrumentality of these gentlemen we were able to charter from the Gran Canary Coaling Company the 'Pedro del Castillo,' a small steam-tug of about 25 tons, which proved a very efficient means of transport to the Salvages. We were very fortunate in being able to do this, as, although there is no lack of excellent schooners at Las Palmas, we should scarcely have been able to undertake the journey in a sailing vessel, for the time at our disposal was limited to about twelve days, and the Salvages lie about 123 miles N. and by E. magnetic from Las Palmas, *i.e.*, almost dead in the eye of the trade wind or brisa, which blows at this time of year with great regularity, and at times—as we found out later on—with considerable vigour.

In addition to the 'Pedro,' her helmsman and engineers, we secured the services of a boat's crew numbering four (Juan, Francisco, Eneas, and Manuel), of one Miguel, who acted as spokesman and (on shore) as cook, and of Pedro, a pilot from Lanzarote, a silent man, brown and blear-eyed, presumably from life-long contemplation of the wind's eye. A most well-disposed, well-behaved, and obliging lot of men they proved, in spite of the fact that we could only communicate our thoughts to them in pigeon Spanish with the help of a dictionary and Ollendorf's 'Manual.'

The 'Pedro' having taken in supplies, and all preparations having been made, the following day (Sunday, 21st) saw us steaming gaily out of the harbour about three o'clock on a sunny afternoon, the warmth of which was tempered by the above-mentioned brisa, which was blowing gently from its accustomed quarter. We were in high spirits. Rafaello, the captain, blew

the 'Pedro's' whistle until the whole harbour was aroused. The 'Pedro' was said to do seven or eight knots, and so we left the mole of La Luz, expecting, with ordinary luck, to anchor off the Great Salvage early on the following afternoon. We were no sooner outside the breakwater, although still sheltered by the land, than we became acutely conscious of the large size of the Atlantic rollers and of the relatively smaller dimensions of our 'Pedro,' to whose credit be it said, as she proved from first to last a safe and excellent sea-boat. She was built of steel, about 40 ft. long, and of a nature so inherently buoyant that in her frantic efforts to surmount the waves she seemed at times to be in imminent danger of turning herself inside out. This made repose on deck out of the question, there being no room to lie down. Below the only accommodation consisted of the hold, the forward end of which was fitted with four wooden bunks. Into some of the vacant space we had stowed our camping and collecting gear, and what remained was used as a resting-place by our crew. The hatchway and wooden skylights being shut down and a tarpaulin made fast over them to prevent the ingress of salt water, it may be imagined that during the night, when all but the watch had turned in and there were several pipes going, the quarters were what sailors call snug.

The next morning broke cloudy with a trifle more east in the wind, which enabled us to set our little fore-and-aft sail. The men were in high spirits, climbing with their almost prehensile feet up the two wire stays that formed the 'Pedro's' standing rigging, and pointing out, as a sure sign that land was near, a Pardella, the "bird that sleeps on shore." Of this bird, the Mediterranean Shearwater (*Puffinus kuhli*), we had already made the acquaintance at Porto Santo, and were destined to see a good deal of before we got home.

In the course of conversation, somewhat laboriously carried on, it transpired that our men considered the distance from Las Palmas to the Salvages to be about ninety miles. The chart, as we happened to know, though there was no such document on board, made it 123 miles, and it soon became evident that there was a great deal of uncertainty about our position, and that our voyage to the Salvages was developing into a search for those islands—a search which might very easily be unattended with success. There was a sailing vessel in sight well down to

leeward. A Spanish schooner our men said, and they determined to hail her, if possible, and ask for information. She was running before the wind, heading evidently for Las Palmas, and we bore down on her to cut her off, which we succeeded in doing after steaming for an hour and a half. When within a quarter of a mile we hoisted our Spanish ensign with a knot tied in it (!), and whistled, and presently had the satisfaction of seeing the object of our pursuit wear slowly round and at the same time hoist French colours. The French barquantine Georges ——er she turned out to be (part of the name being painted on the after ports, which were raised, was illegible), from Havre to Las Palmas. We steamed as near as we could as she lay hove to, rolling heavily, and the captain told us, as near as we could understand, that the Salvages lay sixty-six miles N.W. This was at 8 a.m. We thanked him, bore up once more, and shaped our course N.W. The weather was not very inviting, and at intervals it came on very thick. At three o'clock on Monday afternoon, as it was obvious that we could not make the Salvages that day, we decided to put back for the purpose of making the Peak of Teneriffe and taking fresh bearings from that point. Accordingly we steered south, going easily with wind and sea, and at 5.30, not a little to our surprise, the men descried the Peak up among the clouds. Once more the 'Pedro's' head was pointed northward, and our true course having been determined to every one's satisfaction, though not without a great deal of talking, we steamed ahead. All night we went slowly, as there was a good deal of swell, and we did not want to make the Salvages by running on to them; and very soon after daylight we made out, to our very great joy, first one and then another blue bump on the horizon—the Salvages without a doubt. At eight o'clock we were off the Great Piton, described in the Admiralty chart as three miles long, which it certainly is not. Here we landed one of our party and three men, and the 'Pedro' then proceeded to Great Salvage, some nine miles off, where everything was safely landed by 11.30, the passage having taken us 44 hours. The 'Pedro,' having revisited the Great Piton in the afternoon, and brought back the rest of our party, started on her return for Las Palmas early on the morning of Wednesday, April 24th. We must not omit to mention our indebtedness to Sir M. J. T. Cabral de Noronha, of Madeira, the present owner of the Salvages, for, on

learning our wish to land and collect there, he at once granted permission, only stipulating that we should not shoot his goats, which have now increased to about a score, and become, of course, perfectly wild. We were very fortunate in our landing on the Great Salvage, for the entrance to the Southern Bay winds in and out among rocks, many of which are below the surface, and, except in comparatively calm weather, it must be extremely risky, if not impossible, to land, for the boat has to be backed gradually up to a shelf of rock, and it would be the easiest thing in the world to be stove in when there is anything of a swell. Our men occupied a couple of stone huts built by the Portuguese fishermen just above the landing place, but we preferred our large and comfortable tent, where we soon made ourselves extremely happy. Innumerable hungry fleas, who gave us a warm welcome, tenanted the Portuguese huts, but we were obliged to make use of one of these to shelter our large collecting-boxes and drums of spirits from the sun, which at times was extremely powerful.

The Salvages are entirely of volcanic origin, and the dark steep rocks of the Great Salvage, where we pitched our camp, rise from the sea to a height of from one to three hundred feet. Above the precipices the top of the island is comparatively flat, and mostly strewn with sharp, loose stones, and volcanic *débris*, which made short work of shooting boots, cutting them to pieces. The highest point—there are two conspicuous hillocks—rises to a height of about 450 ft. The most striking plants were the wild tomato (*Lycopersicum esculentum*), with its pretty yellow flowers, pleasant aromatic smell, and small scarlet fruits, which proved delicious eating; the Ice-plant (*Mesembrianthemum crystallinum*), with its lovely white star-like flowers; and the Asparagus (probably *Asparagus scoparius*), which grew to a considerable size, some of the bushes being several feet high, and forming good covert for the Rabbits. There were many other interesting plants, of most of which we procured specimens in flower; we may mention the curious *Phelipæa lutea*, belonging to the Broomrape family, with its thick fleshy stem, ending in a dense raceme of yellow bell-shaped flowers. Among the asparagus and tomatoes, as well as on the rocky faces of the island, there were endless Rabbits, not very large, it is true, but very fat and in splendid condition, with a flavour quite unlike any we have tasted elsewhere. We attributed their excellence to the tomatoes on which they chiefly

feed; baked as our Spanish cook Miguel did them, and served with onions, wild tomatoes, and a little sweet oil, they were truly excellent. Some of these Rabbits were of a light sandy yellow colour, and we made skins of these as well as of the ordinary coloured ones. It is said to be several hundred years since they were introduced, and it seems marvellous to us that they should have thriven so well, and deteriorated so little in size, in such a restricted area, without the intervention of fresh blood. It soon became evident to us that either Rats or some large species of Mouse were numerous towards the top of the island, though we never saw any trace of them about our camp, or on the lower ground, and soon all the traps—smaller cyclone mouse-traps, and large toothless rat-traps—were set in likely runs. On visiting these at six o'clock the following morning, we were rewarded by several captures in the cyclones, and in our ignorance fondly imagined that we had found a new species allied to the House Mouse, and having the same small eyes, but altogether a considerably larger animal. The under parts were pure white, the back brownish, the ears larger, and the tail thicker than in the Common Mouse; in fact, the whole animal, had it not been for its small eyes, reminded us strongly of the Wood Mouse (*Mus sylvaticus*). Mr. Oldfield Thomas, a leading authority on mice, has, however, informed us that the Great Salvage Mouse is the same species as that met with in North Africa. We caught a number of these mice, and brought back a series of beautiful skins. Meanwhile, the rat-traps had done no execution; and, though the flesh with which they were baited was all eaten by the morning, the nocturnal visitors were evidently not heavy enough to start the spring. By setting them very lightly, however, we succeeded in catching two of the mice, but never a rat, and satisfied ourselves that the former were the inhabitants of the rather large burrows, and the only animal of their kind on the Great Salvage. Their droppings were so large that it seemed impossible that they could be produced by anything smaller than a rat of some kind, but we ascertained for certain that this was not the case. Further on we shall refer to the wholesale destruction of the White-breasted Petrel (*Pelagodroma marina*) and their eggs by these comparatively small rodents.

Our arrival apparently caused immense excitement among the bird inhabitants of Great Salvage, our tent being a special object

of wonder, the Pardellas, or Mediterranean Shearwaters (*Puffinus kuhli*), by far the most numerous species on the island, being especially bold and noisy in their greeting. The high volcanic rocks surrounding the south bay are full of miniature caves, in most of which a pair of Pardellas had their home, and towards sunset the whole population turned out, wheeling and squealing round our encampment, and offering the most tempting rocketing shots as they swept over the high rocks above us.

The male, in a harsh guttural voice, cries, "ia-gow-a-gow-a-gow," and the female chimes in, "ia-ia-ia"; and it may be imagined that with thousands of these miscreants circling close round our tent during the night, tired as we were, sleep was almost impossible on the first evening of our stay.

Our daily programme varied little; we got up as soon as it was light, about five o'clock, and after a swim in South Bay, dressed and breakfasted. As soon as the men's work had been settled, we started off on a collecting tour till twelve o'clock, when we dined; after a pipe we again went on the prowl till it was time for supper. In this way we generally found time for about ten hours' steady collecting, and kept our taxidermist well employed in spite of all the help we could give him.

We generally had our evening meal about six o'clock, so as to get it over before sunset, when it soon became dark; and during the whole of our visit we used every night to be mobbed by these noisy Pardellas. "The march past," as we called it, generally commenced about six, and continued with unabated zest till we turned in about 10.30 and heard no more. In spite of the tempting shots they offered, we killed very few of these birds, only such as we required for specimens; but our men were not so sparing, for they used every day to catch numbers for food (they skinned and boiled them!), and took back sacks full to Las Palmas, where, when salted, they are much esteemed by the Spanish fishermen.

The Pardella breeds late, and though during the daytime we found most of the birds in pairs in their rocky nesting chambers, we never procured a single egg; as already mentioned, enormous numbers of the young are collected by the Portuguese fishermen in the autumn, being valued for their oil and downy feathers. The happy couples greatly resent being disturbed in their nesting cavities, and, unless extracted without hesitation, retaliate by

biting with great vigour, their curved bills, with their sharp, cutting edges, being apt to leave an ugly wound on those unskilled in the mode of handling them. Though the majority pass the day in the holes in the rocks, many also rest at sea, and may be seen in flocks floating quietly on the surface at most hours of the day. On our return journey, the 'Pedro' ran right over one of these Shearwaters, sleeping peacefully with its head under its wing, but beyond a rough awakening, it flew off apparently none the worse. After finishing our six o'clock meal, we generally spent the rest of the evening smoking our pipes, and skinning what remained of the birds got during our day's collecting, and attending to the other collections by lantern light. On several occasions we were startled by one of these Great Shearwaters dashing into our midst, like some great white moth dazzled by the light; fortunately none of them ever struck us, or we might have had the worst of the encounter. These birds are evidently the "Cormorants" alluded to by Mr. Knight in his 'Cruise of the Alerte,' p. 85. He writes: "The Cormorants dwelt with their families in fine stone houses, which they had constructed with great ingenuity. Some of the stones were large and heavy; it would be interesting to observe how the birds set to work to move them, and how they put the roof on. I have been told that they rake up a mound of stones with their powerful wings, in such a way that by removing some of those underneath, they leave the roof above them." Of course, this is obviously impossible, some of the stones being a great weight; the fact is, that these little stone huts are put up all over the top of the island by the Portuguese fishermen for the birds to nest in, so that the young may be more easily obtained when they visit the place in autumn. This is commonly done also in the Canaries.

The only other bird of this genus, so far as we ascertained, that visit these islands is Gould's Little Shearwater (*Puffinus assimilis*), the same species that we found breeding at Porto Santo. Here also we procured young in various stages, and one late egg almost fresh; it is large for the size of the bird, and the shell is pure white, and perfectly oval in shape, the two poles being equally rounded. We never saw much of these birds, though one flew into the camp one night; but during the daytime there were generally some to be seen at sea, often in company with the

Mediterranean Shearwater. The note of these birds we never ascertained, and when seen on the wing they were always silent so far as we heard.

Perhaps the most interesting met with was the White-breasted Petrel (*Pelagodroma marina*), a lovely bird, with all the under parts, as well as the forehead and wide eyebrow stripes, snow-white, the upper parts dark sooty grey, and with very long black legs and yellow middles to the webs of the feet. This species was previously known to inhabit the Australian seas, and one or two eggs were obtained many years ago by Gould on the west coast of Australia. One or two specimens had from time to time been obtained off the Canary Islands, and one was recently picked up dead on Walney Island after a great storm, but these were merely regarded as accidental stragglers. We first observed and recognised with pleasure these beautiful Petrels as we neared the Salvages, when numbers were seen flitting along close to the surface of the sea, with their long legs dangling beneath them and just touching the water. Now they would be lost sight of in the hollows between the huge Atlantic rollers, now reappear, closely following, with their graceful, easy flight, the undulating waters. On the afternoon of our arrival, we found an egg of this bird in what we at first mistook for a rabbit burrow, but it was unfortunately broken by one of the men. This, however, opened our eyes, and we subsequently found that large colonies of the White-breasted Petrel were breeding on the flat top of the island, in burrows dug out in the sandy ground, and partly concealed by the close-growing ice-plant. It was very unpleasant walking over these breeding-grounds, which occupied considerable areas, for the ground was honey-combed in every direction with burrows, which gave way at each step, and one's boots rapidly became full of sand. By thrusting one's arm into one hole after another we soon procured a fine series of specimens, accompanied in most cases by an egg, for we had evidently just hit off the breeding season, and most of the birds having laid their single egg were just commencing to sit. The egg is white, more or less finely spotted, and often zoned towards the larger end with dark purplish red dots. Both sexes take part in the incubation, for out of twelve birds captured on the egg, three were males. While thus engaged, we found quite a number of dead birds and sucked eggs, evidently the work of Mice, for their droppings were

to be seen all about the burrows, and the marks of their teeth on the empty shells were unmistakable. The birds, some of which were quite freshly killed and almost untouched, were invariably done to death by being bitten at the nape of the neck, and in some cases part of the brain had been eaten. It seemed curious that these comparatively small Mice should be able to kill a bird several times larger than themselves, and provided with a fairly strong hooked bill; but no doubt the Petrels get caught in the end of their burrow, and being terrified, do not even try to defend themselves. We obtained no young of this species, and the most advanced eggs were at most but half incubated on April 27th. Almost more interesting than the White-breasted Petrels was the square-tailed, white-rumped Petrel (*Oceanodroma cryptoleucura*), of which we obtained but a single example, caught at night with a lantern at Great Salvage, though we saw several flying over the neighbouring seas from the deck of the 'Pedro.' This bird had not yet come to shore to breed, and the only egg we obtained was taken at Porto Santo, near Madeira, in the month of June. It had always been previously supposed that the only small white-rumped Petrel met with in these seas was Leach's Fork-tailed Petrel (*O. leucorrhoa*). That this bird also occurs there is certain, for we have seen a specimen obtained at the Canaries by Mr. Meade-Waldo, but it appears to be merely a straggler so far south; and certainly the square-tailed species is the bird that has generally been mistaken for it. *O. cryptoleucura* was described a few years ago from the Sandwich Islands, and no one had any idea that it was also found in the Canary seas, so that this discovery is a matter of considerable interest to ornithologists. The birds obtained at St. Helena also belong to this form, and not to Leach's Petrel, as has been generally believed. It may be useful to state the main differences between the two.

O. leucorrhoa has the tail *deeply forked*, the outer feathers being much longer than the middle pair, and dark to the base; while the upper tail coverts are uniform white, *not* tipped with black.

O. cryptoleucura has the tail *nearly square*, the outer feathers being only slightly longer than the middle pair, the basal part of the outer feathers is white, and the upper tail coverts are white, *tipped with black*.

The only other Petrel met with was the brownish-black

Bulwer's Petrel (*Bulweria bulweri*), a common bird in the Madeira and Canary seas. We were too early for their eggs, but obtained one taken at Porto Santo in the month of June. The call of this bird is very fine, and was frequently heard at night, a pleasant contrast to the harsh voices of the Great Shearwaters. It consists of four higher notes and a lower, more prolonged note, the whole repeated several times, and uttered in a loud, cheerful strain.

A few pairs of Kestrels and Short-eared Owls were evidently breeding, and we used to see them every day quartering the ground in search of their prey, and it pleased us to think that at least some check was being put on the Petrel-destroyers. About a dozen pairs of the Yellow-legged Herring Gull (*Larus cachinnans*) had nests about the rocky points, but we only found one with eggs, and these were on the point of hatching; the other nests were either empty or contained downy young. These too had their enemies of some sort, for a nest which contained three young the day we found it, had only one remaining a few days later. This may have been the work of other Gulls, but we could not help suspecting the great hook-billed Pardellas of being the culprits; for hundreds of them used to come out of the rocks, or leave their stone houses on the top of the island just before sunset, and fly rather low all over the stony plateau, making the beautiful evening hideous with their incessant cries of ia-gow-a-gow-a-gow; they certainly appeared to be in search of food of some sort, but we had no means of proving our suspicions.

One of the most numerous, as well as the tamest, of small birds on Great Salvage was the Berthelot's Pipit, which is common at Madeira, Porto Santo, and the Canaries. These little birds were our constant companions, and one or two of them were almost always to be seen running about among the stones and ice-plants, generally within a few yards of one's feet. When we arrived at Great Salvage they had not begun to breed, and were generally met with in small companies of three or more; but on the last days of our visit we noted that many had evidently paired, and one or two birds were seen going about with nesting materials in their bills, so the breeding season must have been just commencing. They apparently rear a second brood in the autumn, for several of the birds we shot were in the freshly

moulted plumage of the immature bird, with the feathers of the back, wings, and tail, widely edged with buff; while in the old birds these parts were in a much worn condition. The only other small birds we got specimens of were Swifts (*Micropus apus* and *M. unicolor*), Swallows, which arrived during our stay in great numbers, many entering our men's stone huts after dark, House Martins, and Sand Martins. Besides these, there were a few pairs of Common Terns (*Sterna fluviatilis*), and one day we saw a pair of Turtle Doves fly from the face of a precipice, startled by a shot—the death-knell of a Pardella; while on another occasion, having reached the summit of the island, we suddenly came face to face with a Hobby, and though no attempt was made on its life we were able to identify it beyond a doubt.

The Reptiles in the island were few in number, only two, the Long-tailed Lizard (*Lacerta galloti*), and a small black Gecko (*Tarentola delalandii*), both species being inhabitants of the Canary Islands. We brought back a number of these, both alive and in spirit, and their capture was an endless source of delight to our Spanish fishermen, who became great adepts at finding them, and generally managed to catch them without pulling their tails off! Francisco was indeed indefatigable, and would cheerfully turn over hundreds of heavy stones in a morning in search of reptiles, spiders, millipedes, and such like, being quite as excited over the capture of a new spider for our collection as we were ourselves. Poor man! he always walked bare-foot, and very soon found to his cost that even his horny soles were not proof against the sharp volcanic rocks, for his feet were always more or less cut and bleeding by the time we returned to camp. Every day, weather permitting, some of our men went fishing, but though we obtained a good many species of fish, most of which, especially the sea-perch and eels, were good enough for the table, and various other inmates of the deep, we got nothing of any special interest, all belonging to species known from the Madeira or Canary seas. Among the shells collected we obtained a fine series of the handsome pink land-snail (*Helix ustulata*, Lowe) which is peculiar to the Salvages. Of Lepidoptera, the Painted Lady was very common, varying much in size and colour; and the Gamma Moth, *Plusia gamma*, was constantly to be seen hovering over the white flowers of the ice-plant. Having only a very small boat, we were never able to go very far from shore, and it was

not until the return of the 'Pedro' that we were able to pay a second visit to Great Piton. As we were obliged to catch a steamer at Las Palmas, which was due to leave for Madeira on May 1st, it had been arranged that the 'Pedro' should return for us in good time, and she turned up about four o'clock on Sunday evening, April 28th. Having packed up all our previous collections and baggage, we left Great Salvage, with many regrets, at seven o'clock the following morning. Again we were fortunate in getting all our belongings safely on board, for we had anticipated trouble, as the cases containing specimens preserved in spirits were extremely heavy, requiring several men to move each one, but with a little care we avoided any mishap. On leaving the shelter of the island we ran before a strong wind and following sea; and as we approached the Great Piton, saw that the great rollers were breaking heavily on the weather coast, but by running round to the south side we landed without much difficulty. Of all the lovely natural flower-gardens we have ever seen this island is the most beautiful; and we would gladly have spent a few days camping here, though the collections, from a zoological point of view, might not have been very important. The Salvage Mouse is not found here, and the only mammal is the Common Rat, which had, of course, been imported on some ship; and though we saw no trace of them except a skull, our men assured us that they were plentiful enough.

The birds observed were Whimbrels, Little Ringed Plovers, Turnstones, and a few pairs of the Common Tern, as well as the Kestrel, House Martin, Turtle Dove, and a Goatsucker, shot just as we were leaving the island. What interested us most, however, were the flowering plants, which literally covered the flat sandy surface of the island, making the whole place a blaze of colour. One of the most conspicuous was the Pedosia (*P. paivæ*), a kind of straggling trefoil, only met with on this little islet; it was very plentiful, and its beautiful yellow flowers mingled everywhere with the Sea Lavender (*Statice pectinata*), which varied in tint from almost white to pale violet, and reminded us of a creeping Heliotrope in its general habit. We dug up some of the enormous bulbs of a Scilla, probably *Scilla hyacinthoides*, but as it was not then in flower, it remains to be seen, should it live through the winter, what species it really belongs to. We feel sure that any botanist visiting the Salvages, and Great Piton in particular, will

be well rewarded for his trouble; but he must take plenty of water as well as food with him, for there are no springs of any kind on this sandy islet. In this respect Great Salvage is better provided, but we only used the water for cooking, though our men drank it with impunity.

Much as we wished to do so, we did not land on the Little Piton, though our pilot informed us we might have managed it that day, as the weather was sufficiently favourable. Our captain was anxious to be off, and we were afraid of missing our vessel at Las Palmas—a needless fear, as it turned out, for she remained taking in fruit for two days after we were supposed to sail, to our infinite disgust, as we hardly dared leave the mole, never being certain when the last lot of tomatoes or bananas would arrive. Our being unable to visit Little Piton was the more to be regretted, for none but the Spanish fishermen—and very few of them—have ever landed there on account of the surrounding dangers. Our pilot had been there, and told us that there were neither rats nor mice, and consequently colonies of the White-breasted Petrel bred there unmolested, whilst the small white-rumped species (*O. cryptoleucura*), mentioned above, was also common. Money, or rather the want of it, is said to be the bane of one's existence, but want of time must often be equally annoying to the scientific explorer.

Leaving Great Piton at 11 o'clock, and having bent our awning on to the boat-hook and made a top-sail of it, we ran straight for Las Palmas before a strong wind and following sea, arriving at our destination by 9 o'clock the next morning. Here we settled up our affairs, but were able to do little or no collecting. On at last reaching Madeira, several days later than we expected, one of our party being obliged to return to England, we made a week's trip to Rabacal, Caramujo, the Ribeira do Inferno, and Fanal, in the wildest parts of the north of that island, and were favoured with glorious weather and luck in our collecting; but the telling of our Salvage adventures has already taken so long that we must defer giving an account of this charming tour till some later date. Altogether we obtained during our three weeks' collecting over 200 bird-skins, as well as a tolerably complete collection of all the other natural objects met with, and, having brought them all safely back to England, felt that, besides having thoroughly enjoyed our trip, we had not laboured in vain.

THE HARVEST MOUSE.

Mus minutus, Pallas; *Mus messorius*, Shaw.

By the Editor.

Although spread over a great part of Europe as far as Western Asia, where it was found and described by Pallas as *Mus minutus*, the Harvest Mouse is generally reputed a species of rare occurrence. Several circumstances may account for this. Its very small size and the rapidity of its motions often cause it to be overlooked, or to be mistaken for the young of the Long-tailed Field Mouse, *Mus sylvaticus*. For the first published account of it as indigenous to this country, we are indebted to Gilbert White, although it appears to have been previously seen by Montagu in Wiltshire (*cf.* Trans. Linn. Soc., vol. vii. p. 274). White communicated his discovery to Pennant (Nat. Hist. Selborne, Letter xiii.), who published it in the second edition of his 'British Quadrupeds,' and thence it has been copied with but little addition by almost every writer on the subject of British Mammalia.

It has been reported from so many widely separated English counties that it may be regarded, at all events, as generally though locally distributed, and perhaps often overlooked, in most of the midland and southern districts. In Northumberland and Durham, according to Messrs. Mennell and Perkins,* there are but few recorded localities for this species, but among them the following is worthy of note from its great elevation. Mr. William Backhouse has taken it at St. John's, Weardale, 800 feet above the level of the sea.†

In the district of the English lakes, according to Mr. Macpherson, it is extremely rare. Many years ago a typical nest was found at Blackwell, and in 1888 a specimen was secured at Silloth, but these are the only two instances noted of the appearance of this mouse in Lakeland.

In Yorkshire, according to Messrs. Clarke and Roebuck, it is very irregularly and thinly distributed. A specimen with the nest affixed to the stems of *Centaurea nigra* was long preserved

* "Catalogue of the Mammalia of Northumberland and Durham," Trans. Tyneside Nat. Field Club, vol. vi. (1864), p. 171.

† *Op. cit.* vol. iv. p. 94.

in the Chester Museum, and said to have been taken in the neighbourhood (Newstead, Proc. Chester Soc. Nat. Sci. vol. iv. p. 248). There appears to be good authority for locating the species in the following counties:—Lancashire (Byerley), Staffordshire (Garner and Masefield), Leicester (Harley and Widdowson), Norfolk (Lubbock and Gurney), Suffolk (Rope and Moor), Cambridgeshire (Jenyns), Warwickshire (Tomes), Worcestershire (Hastings), Hertfordshire (Bond), Essex (Laver), Kent (Collingwood), Sussex (Harting), Hampshire (Gilbert White), Isle of Wight, Shanklin (A. G. More),* Wiltshire (Montagu), Gloucestershire (Knapp, Witchell), Devonshire (Montagu, Rowe, Bellamy, Parfitt), and Cornwall (Couch and Rodd).

In Scotland, according to Macgillivray (Brit. Quad. 1838, p. 257), it has been met with in Aberdeenshire, Fifeshire, and near Edinburgh. Thomas Edward has added Banffshire. As regards Edinburgh, Mr. William Evans, Secretary to the Royal Physical Society, who has paid close attention to the mammalian fauna of that district, reports that his efforts to obtain specimens have been singularly unsuccessful, and considers that it must be very local and nowhere numerous. Mr. Small, taxidermist, of Edinburgh, many years ago received two from Banffshire, and in August, 1885, Mr. Evans found a nest of this mouse in a tuft of coarse grass growing under a hedge surrounding a cornfield behind Aberlady, in East Lothian. It was about eighteen inches above the ground, and was supported entirely by the stems of the grass and a few twigs of the hedge. In 1870 he was informed by Mr. D. F. Mackenzie, factor, of Mortonhall, near Edinburgh, that he had obtained a number of compact round nests among a heavy crop of oats on the home-farm there. They were placed one or two feet from the ground, and belonged to a small reddish mouse which he saw more than once sitting on the heads of the corn.†

As regards Ireland, Bell states (p. 291) that "it would seem to be very rare there, but through the kindness of Dr. Kinahan

* This species is included in Venables' 'Guide to the Isle of Wight,' in a list of the Mammalia by A. G. More; but in the subsequently published 'Guide' by Jenkinson (1876) it is stated (p. lxix) that "Mr. Bury was once informed that a few specimens had been obtained near Shanklin, but it is possible that the young of *Mus sylvaticus* were mistaken for it."

† 'Mammalian Fauna of the Edinburgh District,' 1892, p. 79.

he is enabled to record it as an inhabitant of that country." On this it may be observed that Thompson thought it could not with certainty be included in the fauna of Ireland, while the late Mr. A. G. More ascertained that the species referred to by Dr. Kinahan was the young of *Mus sylvaticus*.

The accurate account given of it by White should be read by every one who desires to know something of its habits. He measured one, and found that from nose to tail it was just 2¼ in. with a tail 2 inches long. Two of them in a scale weighed down just one copper halfpenny, which is about a third of an ounce avoirdupois, or one-sixth the weight of an adult common House Mouse. The average dimensions of seven adults, irrespective of sex, taken in Suffolk by Mr. Rope, were as follows:—Length of head and body, 2 in. 7½ lines; length of tail, 2 in. 1 line; total length, 4 in. 8½ lines.

The colour of the Harvest Mouse, though very beautiful, is in most works given in rather general terms, without going much into details, and gives the idea of a uniform tint prevailing on the upper parts; whereas, in all the specimens which have been examined, the bright sandy yellow or orange-fawn of the upper part was purest and brightest towards the tail; being focussed (so to speak) on the hind-quarters just at the root of the tail, and extending underneath as far as the vent. This bright but delicate tint shades off gradually, above, into the light yellowish or orange-brown which is the prevailing colour of the upper parts, the latter hue becoming again brighter and lighter as it extends downwards to meet the white of the under parts, The fur of the cheeks and that surrounding the ears is also bright sandy or orange; the hams are nearly always of that colour, varying, however, in intensity in different individuals. There is considerable variation, too, in the colour of the upper parts, the brilliant fawn tint being more or less wanting in some specimens, whereas in others it is more generally diffused, and less concentrated on the hind-quarters, being apparently most pronounced in the female sex. The long and beautifully formed flexile feet are covered with fine hairs of a yellowish colour, shading off on each side to white, the under side being naked. The tail is scantily furnished with short hairs as far as the extremity.

With regard to the colour of the young, I remarked in the

case of some which were born in confinement, and whose parents were captured in a wheat rick in Sussex, that even when almost as large as the old ones they were not nearly so red. Indeed, until the beginning of December they resembled a House Mouse in colour. About that time, however, they began to change visibly, the hinder quarters, from the root of the tail upwards, becoming rufous before any other portion of the body. This change of colour in the winter I was not prepared for, as I should rather have expected the change from brown to rufous to have taken place in the spring.*

The period of gestation is believed to be the same as with the Long-tailed Field Mouse, namely, three weeks, the number of young, which are born blind, varying from five to eight.

Mr. E. C. Moor, writing from Woodbridge, Suffolk, says:—"During the summer of 1883, especially at harvest-time, several nests of the Harvest Mouse were taken by me, mostly from barley-fields, being placed upon the laid barley. Almost all contained young ones, numbering from six to eight; and it was surprising to see how eight fair-sized mice could possibly live in a nest hardly as large as an orange."

During the summer months the Harvest Mouse lives in the open country, evincing a partiality for the borders of ditches in proximity of corn-lands, building its globular nest amongst the tall rank herbage growing in such situations, or in low bushes close by. Mr. Rope found one in Suffolk, in a low blackthorn bush growing by the side of a ditch, and another in a plant of the common broom.† Prof. Schlegel discovered one amongst the branches of a shrub (*Hippophaë rhamnoides*) on the sand-dunes in Holland, and a second in oak-scrub about a mile from the sea. Other plants observed by him to be selected for nesting in were *Rubus fruticosus*, *Rumex acetosa*, and *Epilobium*.

The nest is composed of grasses, blades of wheat, or split leaves of the reed, and is suspended among the living plants at a little distance from the ground. It is lined with short pieces of grass split by the little animal's teeth, and thus rendered softer and more available for the purpose. A nest found by Mac-

* A full account of the habits of these mice as observed in confinement, and the mode of treatment adopted with them, was published in 'The Field' of Jan. 2nd, 1875.

† Zool. 1880, p. 57.

gillivray in Fifeshire was composed of dry blades of grass in the midst of a tuft of *Aira cæspitosa*. In Essex Dr. Laver reports that he finds these small mice more often in corn stacked in the fields than in that which is carted home, but that when the harvest is carried they find their way to the ricks, evincing a partiality for wheat, but eating oats and barley too when wheat fails them. In Suffolk Mr. Rope has found them as often in stackyards attached to farm buildings as in outlying stacks, and this has been the writer's experience in West Sussex. After the stacks have been threshed, they often remain in the straw throughout the winter.

That the Harvest Mouse, during the summer months, constructs for itself a bird-like nest suspended amongst the stalks of growing plants has of course been long known—in fact, ever since Gilbert White, in 1768, announced the fact in a letter to Pennant as above noticed. He also remarked that "in the winter they burrow deep in the earth and make warm beds of grass, but their grand *rendezvous* seems to be in corn-ricks, into which they are carried at harvest. A neighbour," he adds, "housed an oat-rick lately, under the thatch of which were assembled near a hundred, most of which were taken, and some I saw."

A curious divergence of habit in this little creature when in its winter haunts has only of late years been announced. The late Prof. Schlegel, of Leyden, with whom it was once the writer's privilege to spend a week, discovered the interesting fact that it sometimes builds a winter nest, into which at the cold season it retires. A very pleasing account of his observations on this point was published in the periodical 'Notes from the Leyden Museum,' vol. iii. pp. 23–28 (1881), and will be found reprinted in 'The Zoologist' for that year (pp. 233–237).

The locality in which this discovery was made is situated at a distance of about two miles from Leyden, in the neighbourhood of the Castle of Endegeest, celebrated as having served as a refuge to the philosopher Descartes after his exile from France. Here, on the right-hand side of the road leading to the village of Rynsburg, not less celebrated for its abbey than for being the residence of Spinoza, there is to be found a ditch some quarter of a mile in length and six paces in width. Part of the border of this ditch was grown over with reeds. Close observation soon

showed that these reeds actually contained about fifty nests of this little mouse. During the breeding season these were of the usual globular form, of the average size of a man's fist, and showing near the top a small circular opening for the entrance of the little animal. But the winter nests were quite different. These were composed of various mosses, and were attached to and between several stems of reeds, exactly like the nests of the Reed Warblers, but more fusiform, of from six inches to a foot in height, and from three to four inches in diameter. They showed no inlet, and were placed at the height of a foot over the water's level. The animal when entering had to remove the upper part of the covering, which was less densely interwoven, and was concealed between the moss. It appears evident that the building of these nests was a just calculation of being safe against the danger of drowning, in the same way that Swans and Moorhens have been observed to build their nests in time of flood above the reach of the rising water. Some of the mice in the case above noticed went a step further, and adapted to their own requirements the deserted nests of aquatic warblers, which they covered with a cap of grass.

The manner of feeding is very like that of a Squirrel, sitting up on the haunches and holding the food in the fore paws. Mr. Rope has thus described the mode in which a grain of wheat is manipulated:—"Sitting up and holding the grain in a horizontal position between the fore paws (one being placed at each end), the little animal begins dexterously and rapidly turning it round, like a wheel on its axle, at the same time applying it to the edge of his sharp incisors, and by their means slicing off the outer skin or bran, and letting it fall like the shavings from the tool of a wood-turner at his lathe, to whose operations the whole process bears a striking resemblance; nor does he begin eating till he has reduced the grain to a perfectly white and almost cylindrical body." On one occasion Mr. Rope was surprised to see one devouring the seed of the broom.

Mr. J. H. Gurney has remarked (Zool. 1884, p. 112) that the Harvest Mouse in confinement is very fond of Canary seed, as much so, he says, as of wheat; and in spring he found that they appreciated twigs of hazel, the leaf-buds and partly expanded leaves of which they devoured with great avidity. A bunch of fresh moss with the earth adhering to the roots was also a great

treat to them. They eagerly burrowed into this, probably in search of small insects. As to its insectivorous propensity, the Harvest Mouse has been found by many observers to be partial to flies of several kinds, which they catch very adroitly, and without the least apparent effort or exertion. The Rev. W. Bingley, in his 'Memoirs of British Quadrupeds,' has given an interesting account of the Harvest Mouse in captivity, and thus describes its dexterity as a fly-catcher:—

"One evening as I was sitting at my writing desk, and the animal was playing about in the open part of its cage, a large blue fly happened to buzz against the wires; the little creature, although at twice or thrice the distance of her own length from it, sprang along the wires with the greatest agility, and would certainly have seized it had the space betwixt the wires been sufficiently wide to have admitted her teeth or paws to reach it. I was surprised at this occurrence, as I had been led to believe that the Harvest Mouse was merely a graminivorous animal. I caught the fly, and made it buzz in my fingers against the wires. The mouse, though usually shy and timid, immediately came out of her hiding place, and, running to the spot, seized and devoured it. From this time I fed her with insects whenever I could get them, and she always preferred them to every other kind of food that I offered her." *

On this subject Mr. Rope, writing also of a mouse of this species observed in captivity, has remarked (Zool. 1884, p. 57):— "On a fly being put into the cage, the mouse, instead of rushing about after the insect, appears at first to take no notice whatever of it; but when the latter, in buzzing about the cage, approaches within its reach, in the twinkling of an eye he has it firmly grasped in his paws, and it is devoured almost before one can realize the fact of its being caught; the wings and legs are generally rejected. These mice will probably devour many other insects, and I have seen woodlice eaten by them." Even a cockroach, large as it is, fares no better, although there is a certain amount of hesitation in seizing this more formidable-looking prey.

Although an accomplished climber, every movement being performed with ease and grace, the Harvest Mouse has not the extraordinary speed and activity so characteristic of the House

* This observation is confirmed by the Rev. P. Bartlett (Zool. 1843, p. 287), who adds that it drinks water eagerly; and I have seen those which I kept in confinement lap milk with avidity; the tiniest tongue and the most miniature process of lapping imaginable.

Mouse, and on this account when discovered it is more readily captured. Its prehensile tail is a noteworthy feature, and it is of great service to the little animal when descending the corn-stalks. My little captives, when going round in the wheel provided to give them exercise in their cage, invariably made use of their tails to steady themselves upon the slender wire, and lashed it round the wire to bring the wheel to a standstill. The appearance presented when the tail is used for grasping is accurately represented in the figure of this animal which accompanied the article on the Weasel (Zool. 1894, p. 454), to which active little mouse-hunter it must often fall a prey.

NOTES AND QUERIES.

Wild Animals killed in Norway in 1894.—The official list of birds and beasts of prey killed throughout Norway last year (1894), and on which the Government rewards were paid, has been recently published. The details are as follows:—

Provinces.	Bears.	Wolves.	Lynxes.	Gluttons.	Foxes.	Eagles.	Hawks.
Smaalenene	—	—	—	—	332	2	315
Akershuus	—	—	1	—	391	1	219
Hedemarken	—	—	—	1	725	12	460
Kristian	11	—	—	—	628	129	314
Buskernd	6	—	2	—	471	65	324
Jarlsberg and Larvik .	—	—	—	—	323	9	366
Bratsberg	9	—	14	—	413	64	347
Nedenaes	3	—	2	—	250	15	258
Lister and Mandal . .	2	—	—	—	220	7	83
Stavanger	—	—	—	3	214	26	233
S. Bergenhuus . . .	—	—	—	1	640	36	386
N. Bergenhuus . . .	8	—	2	4	705	73	203
Romsdal	4	—	2	14	385	71	184
S. Trondhjem	—	5	6	2	481	55	374
N. Trondhjem	8	15	8	4	341	80	311
Nordland	3	1	7	6	703	321	239
Tromsö	1	—	—	1	422	70	75
Finmarken	2	16	—	10	1002	45	36
Total	57	37	44	46	8646	1081	4727
For the previous year the numbers were .	72	50	56	40	11,400	969	4846

The reward for killing a Bear is 20 kroners, and so also for a Wolf, Lynx, or Glutton; for a Fox, 4 kroners; for an Eagle, 2 kroners, and the same for Goshawks.

MAMMALIA.

The Field Mouse of the Outer Hebrides.—I wish to slightly amend my description of the Field Mouse of the Outer Hebrides (p. 369), and prefer to call it a sub-species of *Mus sylvaticus*, as it is clearly the local representative of that animal. The name will therefore be *Mus sylvaticus hebridensis*. I shall in so naming it stand with the trinomialists; but I see no other course, for I hold that there must be some link to group the species of the large genus *Mus*. Having neglected to mention the type, I now select the first specimen in the table on p. 370, which is now in the British Museum, Reg. No. 95, 10, 25, 1, collected and presented by myself.—W. E. de Winton.

The Field Mouse of the Outer Hebrides.—In the article by Mr. W. E. de Winton (p. 369) upon this new variety of *Mus sylvaticus*, he ignores the fact that it has already been described by me (Journ. Birmingham Nat. Hist. Society, April, 1895, p. 135), and again briefly in my observations on the fauna of St. Kilda (Zool. Aug. 1895, p. 281), from a specimen taken from that out-of-the-way locality in May, 1894, and forwarded upon my return to the Editor, and by him to Mr. Oldfield Thomas. I think that at present no definite conclusion should be arrived at until further specimens have been procured from various other islands along the west coast and north of Scotland, including the Inner Hebrides, Orkney, &c., as well as the adjacent mainland. Until this has been done it seems rather premature to describe it as a new species. I append a copy of my former note above referred to (Journ. Birm. Nat. Hist. Soc.), which ran as follows:—"The Common Mouse we trapped constantly; a slight difference was noticed in its coloration from those found with us. Unfortunately only one specimen of the Long-tailed Field Mouse was taken, this being by far the most interesting of all our captures; it is probably the type resident in these islands, and differs from our ordinary form by the adult having the fur on the back greyish-brown similar to the young of our Long-tailed Field Mouse, instead of reddish-brown as in our adult type, and on the belly the fur has a lovely pink shade insead of pure white. The whole of the mice taken are now in the British Museum, and I might add a supply of traps, &c., has been sent out by the authorities to secure, if possible, further specimens. I hope in the future, if I am spared for another visit, to be able to get additional specimens. The Outer Hebrides are likewise being trapped to obtain, if possible, any intermediate forms."—J. Steele Elliott (Dixon's Green, Dudley).

Natterer's Bat in Yorkshire.—On August 9th Mr. Alfred Kebbell kindly gave me a living specimen of *V. nattereri*, which had flown into his house in this village on the previous evening.—Oxley Grabham (Flaxton, York).

The Lesser Shrew and Water Shrew in Yorkshire.—In August last I had brought to me a female Lesser Shrew, *Sorex minutus*, and when preserving it found it to contain five fœtal Shrews in an advanced stage of development. In September I picked up dead on a footpath a beautiful melanic variety of the Water Shrew, *Crossopus fodiens*, with the under parts almost as dark as the upper, but unfortunately it was much too far gone for preservation.—Oxley Grabham (Flaxton, York).

Bank Vole in Kent. — While snail-hunting round Canterbury last August I came upon a nest of young Bank Voles, among some refuse in a hedge-bank. I had one in my hands for some minutes, and am sure of its identity. I do not remember its being recorded in Kent hitherto, but I believe it to be very common from the number of runs seen in the neighbourhood.—Lionel E. Adams (77, St. Giles Street, Northampton).

BIRDS.

The Rate of Flight in Birds. — In the October number of this Journal (p. 378) the Editor adds an interesting and valuable note to Mr. Butterfield's communication on this subject. On the authority of Herr Gätke (English edition, p. 470), he remarks that in the case of the American Golden Plover, *Charadrius virginicus*, flocks have been met with at a distance of 400 geographical miles east of Bermuda, flying in a southerly direction on their way from their breeding-places in Labrador to Northern Brazil. The distance between these points is 3200 miles, and since there is no point between on which they could alight for rest, they are obliged to perform the entire journey in one uninterrupted flight. The velocity in fifteen hours would amount to 212 miles per hour. It is not, however, strictly accurate to state that the American Golden Plover has no point in this long journey at which it can alight for rest. A glance at an atlas will show that the same meridian of longitude passes through East Labrador and the island of Bardados, the most easterly of the Lesser Antilles, and exactly in the line of flight of the migratory hosts passing from Labrador and regions further to the north to South America. If a reference be made to a paper on the birds of Barbados, published in 'The Ibis' for 1889, it will be found that I have therein made some observations on the large number of American Golden Plover that annually alight on that island during the months of August, September and October, whilst stragglers appear as late as November. The first arrivals are invariably dark-breasted birds, showing that the old birds precede the young, and the first arrivals are nearly all males. Great as are the numbers of this species that do alight in Barbados, attracted by decoy birds purposely set out as lures, and by the call-note of the Plover, admirably imitated by the island gunners, yet the flocks that descend are a mere fraction of those that pass over. Waiting at the decoy-huts for flocks to come down to the

lures pegged out on the most attractive spots of green sward, carefully prepared by pools of water, I have watched countless numbers of Plover passing overhead on their southward migration. On some days no allurement could induce them to descend to the tempting spots prepared for their destruction, and their sharp whistle and rapid air-cleaving flight showed no symptom of fatigue; the major portion of these great flocks continued their southward flight from morn to eve without circling or gyrating over the island. One might imagine that to these migrants, compassing an ocean flight of 3200 miles, nothing would be more attractive than the island of Barbados, looking like a Garden of Eden set in that waste of waters. But it does not appear that such is the case, nor that there is any absolute necessity, born of fatigue, for the Plovers to break their journey by resting on this island, and that it is rather a matter of volition, and not weariness, when they do alight on the island of Barbados.—H. W. Feilden (Wells, Norfolk).

Rate of Flight of Birds on Migration.—This is a subject on which there is, and must continue to be, much divergence of opinion amongst naturalists. The very remarkable statements made by Herr Gätke, in his chapter "Schnelligkeit des Wanderflugs" ('Die Vogelwarte Helgoland,' p. 65), appear to be incredible to naturalists. Yet there is much to be said in support of his estimates of speed of birds in full migratory swing. I remember some years since, when in Heligoland, Mr. Gätke mentioned the fact, now recorded in his book, that repeated observations had shown that, in the spring migration, Plovers, Curlews, and Godwits, flying across the island at a rushing speed, reach the oyster-beds, 22,000 feet to the east, within the space of one minute, or at the rate of 240 miles an hour. Professor Newton, in his excellent article on "Migration" ('Dictionary of Birds,' Part II. p. 566, foot-note), commenting upon this statement, says:—"Yet, to do Herr Gätke justice, I must admit his general contention to be sustained by a good observer, Mr. Oswald Crawfurd, who states ('Round the Calendar in Portugal,' pp. 154–156), in regard to the wonderful speed with which Turtle Doves fly on migration in autumn, that he once made a calculation to arrive at the pace of their travelling; 'but the result came out in such surprising figures' that he would not set them down. He convinced himself, however, that, if the flight was continuous, Turtle Doves leaving 'Kent or Surrey at dawn, might easily be the birds that a few hours later were skimming over the Portuguese pine-forests on their way to Central Africa.'" The flight of driven Grouse or Partridge, Teal rushing down to water, belated Starlings flying to their roosting-places—that is, birds *with an impulse upon them*—probably greatly exceeds the speed of our fastest express trains. Man's ordinary progression is a walk, or a maximum of four miles an hour, but when trained, or put to it, he will do his mile in a few minutes. Migrating birds seen coming in from the sea in the daytime,

as Rooks, Starlings, and Larks, certainly do not seem to travel at an abnormally high rate of speed. I myself have repeatedly calculated the flight as not exceeding forty to fifty miles an hour, and often less. It is possible, however, that on nearing land and the end of their journey, final or temporary, they descend from a high altitude where, for hours together, a much greater rate of travel has been maintained,—slacking speed, or, if I may use the expression, shutting off steam, as they near the terminus. Of course these remarks apply to birds only crossing the North Sea, or making long and continuous journeys in the spring and autumn. Our small summer guests, the Chats, Warblers, and Flycatchers, to a great extent move south by a hedge-to-hedge migration, in slow stages, till they reach the south or south-east coast, crossing the English Channel, again to resume the land journey across sunny France and sunnier Spain to the land of endless summer. —JOHN CORDEAUX (Great Cotes House, R. S. O., Lincoln).

Origin of the terms "Cob" and "Pen."—In your article on this subject (pp. 372—374), the word "cob" is taken to refer solely to the "knob" at the base of the upper mandible, and in that case may have meant merely a projection. The Swan, therefore, would be so called from its most characteristic feature. It is worth noticing, however, that some of the provincial glossaries explain a "cob" as a stone-horse as contrasted with a gelding or mare; and certainly "cob," in some English dialects = *testiculus*. I think, however, your explanation is probably the right one. With regard to the derivation and original meaning of "cob," the question is very difficult. Of course *cob* or *cop* is the word answering to *knopf*, and both these words have probably gone through the same development. The words mean (1) a bowl; (2) a head; (3) a prominent or projecting point: the question is, what is the order of the development of these meanings. Kluge, sub voce *knopf*, seems to think that there may have been for *knopf* a Germanic meaning of head; although *haupt*, the philological equivalent of *caput* and of our word *head*, is the true O. German word. A very probable theory is that the word originally meant a bowl, and then came to be employed for head (cf. *testa* and *tête*). In any case we find in M.E. *copp* for *top; coppod* (capped = *cristatus*) of snakes. The French word *coiffe*, which probably came into France through the Italian *cuffia*, points to the existence of an old German word "*kupfe*," "head covering," from which word it sprang; and this fact shows that this use of the word is very old. The word *cob* in English seems sometimes to take the metaphorical meaning of round and projecting; sometimes of something large. In Welsh we have *cop* for a head; and in Lancashire *cop* is used for a low hill. The well-known Dutch *kopje* of the Boers in South Africa is, of course, the same word. "Cob" was used in Hoccleve (1420), (see Murray's Dict. s.v. "Cob") for a leading man, as we say, a "big" man. A cob loaf would seem to mean

a rounded loaf (in 'Troilus and Cressida,' ii. 1, Ajax uses the word "cob loaf" as a term of reproach to Thersites), just as "cob" is commonly used for a strong, stout, stumpy horse. On the other hand, in "cobnut" we probably have the idea of size indicated, in contrast with filberts or hazel-nuts. I may notice that the term "a cob of hair" for a tuft of hair is still used in Cornwall, apparently a survival of the old Celtic word in its Celtic sense. Mr. Cross, the animal importer, of Liverpool, informs me that "Cob" and "Pen," as applied to Swans, are regular terms of the trade, used in all parts of England where Swans are bought and sold. Browning, in his 'Sordello,' probably following Ben Jonson in his 'Catiline,' uses the term "Cob-swan." The word *busk*, which you have used to denote the peculiar action of a Swan in arching or bushing out the wings over the back, is (like *bask*) interesting as containing the Scandinavian passive formation, *bua*, to prepare; *buask* (for *bua-sik*), *se préparer*. *Bush* is said by Prof. Skeat to be due to a French pronunciation of the English word *busk*. If the male Swan be invariably the bigger bird, it might be natural to suppose that he would be called "Cob" from his size. I imagine you are right about the "Pen" Swan's name. We must not forget Milton's expresssion, "They sum their pens." The desideratum is to discover the earliest documents in which the names "cob" and "pen" occur.—Herbert A. Strong (University College, Liverpool).

Origin of the terms "Cob" and "Pen."—I am inclined to take Dr. Murray's view (New Eng. Dict.) that the notions of *cob* are "something big, or stout"—"something forming a rounded lump," &c. He adds, "Thus *cob-nut* can hardly be separated from the notion of 'big nut' on the one hand, or from that of 'fruit stone' on the other." These ideas of sturdiness and roundness seem quite mixed up. It does seem very likely that "cob = round stone" is the primary idea; and then the notion of sturdiness, bigness, masculinity was easily superadded. I do not see how we can ever settle so intricate a tangle as this. Wedgwood mentions not only *cob-nut* and *cob-stone*, but *cob-coals*, i. e. "large" coals. Ray has *cobby*, stout, hearty, brisk. Lonsdale dialect, *cobby*, tyrannical, set up, proud: see *Cobby* in Murray. I think *cob* sufficiently conveys the notions of bigness, stoutness, hence "male," without any necessary reference to the *cob* on the bill: though of course that *might* be it. *Pen* I can make nothing of. There are two pens: (1) enclosure, sty; (2) feather. *Pen-swan* is entered under (2) in the 'Century Dictionary.' But they do not say why *pen-swan* comes under Pen (2) more than under Pen (1), and I find no evidence. It looks very much as if the origin of *cob-swan* is a little dubious, and that of *pen-swan* is unknown.—W. W. Skeat (Cambridge).

Origin of the terms "Cob" and "Pen."—Surely your "Cob" and "Pen" are Welsh words—I write Celticè. But any Welsh dictionary gives *côb*, a tuft or bunch, and our English *cob-nut* is a round nut. This

exactly coincides with your interesting conclusion about the prominent and largely developed "knob" at the base of the bill in the male (p. 374). *Pen* is a common Welsh word also for "head," and is applied to birds thus: *Penddu* (pronounced *Penthee*)=the Blackcap; *Penaur*, the Yellowhammer; *Penwyn*, the bald Buzzard (*i. e.* Marsh Harrier). All this is from Dr. Richards' Welsh-English Dictionary, printed at Wrexham, and it seems to point strongly to Welsh favouritism for the female Swan as the head (*pen*) of the birds. You will perhaps say this is all *pen-gamrwydd*, which Dr. Richards delightfully renders "wryness of head"! Surely the Wryneck is humanized—a curious instance of the Welsh worship of birds. The Welsh for "Swan" is *Alarch*, plural *eilarch*, a word surely connected with *alon*, music, and the Whooper "fluting a wild carol ere his death." It may not be amiss to add that our word "eider" is the Welsh *ydyr*, signifying "downy," and was applied to cygnets at least as early as 1553, as appears from an entry in Kirby's 'Annals of Winchester College,' p. 276. —H. D. Gordon (Harting Vicarage, Petersfield).

Origin of the terms "Cob" and "Pen."—*A propos* of your remarks on the derivation of the term "cob," as applied to the male Swan (p. 373), it may interest you to learn that the fishermen here in North Yorkshire make a common use of the word "cop" in referring to a bird's crest. I have occasionally been told that some of the men have seen "a Sawbill (*Merganser*) with a grand cop," and have heard of "a duck with long feathers in its tail and a white cop"=(Long-tailed Drake). Other examples might be cited, but these will suffice to illustrate my meaning. There are still many words in daily use in Cleveland which are almost pure Anglo-Saxon or Danish, no doubt transmitted from the original settlers on these shores, the descendants of whom are to be found in the North Riding.—T. H. Nelson (Sandringham House, Redcar).

Alleged abnormal Nesting of the Goldcrest in Ireland.—In all deference may I suggest that it is hardly correct to refer to the nesting-site of the Golden-crested Wren, *Regulus cristatus*, against the sides of ivy-covered trees as abnormal. Mr. A. T. Mitchell (p. 385) draws attention to the fact that in his experience such is the situation commonly selected in Ireland, in contradistinction, as he believes, to that appropriated for the purpose of nidification by the species in England. I am naturally in ignorance as to whether Mr. Mitchell is writing from personal knowledge of the nesting economy of the Goldcrest in the latter country, or whether his opinion is based on the writings of our standard authorities; but, in any case, I am presumptuous enough to think that silence on the point at issue on the part of those to whom we are accustomed to look for light and leading where the habits of birds are concerned arises from the fact that no small portion of the ornithological literature of these islands is attributable

to praiseworthy compilation rather than original observation. I have found nests of the Goldcrest placed against the sides of ivy-clad trees in some half-dozen instances during my nesting career in England, and my argument is that, if so many could be found by a single individual, there must be very many others which pass unobserved. The first nest I discovered so located was on the banks of the river Lugg, between Mortimer's Cross and Aymestrey, in Herefordshire. Another was by the side of the avenue leading to Place Castle, near to Fowey, in Cornwall. Yet another was in the gardens at Nosely Hall, in this county (Leicestershire) In my 'Original Sketches of British Birds'—a work on the eve of publication—I have made particular allusion to this not altogether unfamiliar situation for the Goldcrest's nest, though I have often marvelled at its being one which authors with common consent have apparently ignored.—H. S. Davenport (Skeffington, Leicester).

Abnormal Nesting of the Goldcrest in Ireland.—In the last number of 'The Zoologist' (p. 385), Mr. A. T. Mitchell mentions that the Goldcrest, *Regulus cristatus*, commonly builds in ivy-covered trees. I think the following table, taken from my notes of seventeen nests of this species found in the county Dublin, may be of interest:—

No.	Year.	Tree or Shrub.	Position as regards Branch.	Height from Ground.
1	1883 (?)	Spruce fir	Beneath	13 ft.
2	1884 (?)	Silver fir	Above	11 ,,
3	1885	Ivy against ash	Do.	5 ,,
4	,,	Gorse or whin	Do.	6 ,,
5	1889	Ivy against Scotch fir	Do.	30 ,,
6	1890	Ivy against ash	Do.	14 ,,
7	1891	Cypress	Beneath	18 ,,
8	,,	Evergreen oak	Do.	12 ,,
9	,,	Do.	Above	9 ,,
10	,,	Do.	Do.	40 ,,
11	,,	Do.	Do.	11 ,,
12	,,	Silver fir	Do.	8 ,,
13	,,	Do.	Do.	20 ,,
14	1892	Do.	Do.	15 ,,
15	1894	Thorn	Do.	7 ,,
16	,,	Ivy against *Phyllyrea*	Beneath	6 ,,
17	,,	Ivy against thorn	Above	10 ,,

These statistics tend to support Mr. Mitchell's observations.—J. Trumbull (Malahide).

Richardson's Skua at Hastings.—On Aug. 30th a very dark-coloured specimen of Richardson's Skua was shot at Rye, and brought to Bristow, the taxidermist, for preservation. A few days afterwards a very light-coloured one was picked up dead at Sidley, near Bexhill, with an old wound in the eye and the gizzard empty. Both were young birds.—G. W. Bradshaw.

Roller in Northumberland.—On the morning of 24th Sept. last a good specimen of the Roller, *Coracias garrula*, was shot in the grounds of Callaly Castle, the ancient seat of the Claverings, about three miles S.W. of Whittingham station on the Alnwick and Cornhill line. I happened to be in the house at the time, and so was able to examine the bird while still quite fresh. It was apparently a bird of the year, but a very good specimen. I believe about a dozen specimens of the Roller are recorded to have been met with in Northumberland during the present century.—H. B. Tristram (Durham).

American Yellow-billed Cuckoo in Dorsetshire.—Noticing the communication under this heading (p. 376), it has struck me that the bird here mentioned is very probably identical with some which travelled for a week with me early in October. I left Boston, Mass., on the steamship 'Ottoman' on Oct. 1st, and when off Cape Race ten or fifteen birds came on board. There was plenty of hay on the deck, which afforded them shelter and perhaps food. Six or more of them were caught by the engineers, while three others were about the decks up to twenty hours of our making the Irish coast, at 8 a.m. on Oct. 10th. I should think the specimen alluded to might have been blown off a cattle steamer, such as ours was, bound for London. All depends on the identification of the species, and I will try and send you one of our captives to clear up the matter and settle its identity.—Ralph L. Neilson (Fulwood Park, Liverpool).

[The specimen picked up dead in Dorsetshire, as mentioned p. 376, was found there on Oct. 5th.—Ed.]

Honey Buzzard nesting in Herefordshire.—The interest in Mr. W. E. de Winton's note on this subject in the most recent issue of 'The Zoologist' will surely be grievously discounted in the estimation of ardent field-naturalists by the reflection that a most untoward fate has overtaken a beautiful and essentially harmless species. That both male and female should have perished is simply deplorable. It was only four or five years ago, when shooting at Bishopswood, that I stopped to examine a specimen of the Rough-legged Buzzard, *Buteo lagopus*, which had been killed and gibbeted in one of the woods, and was dangling to and fro in the breeze in company with other less distinguished tattered and decaying frames. As in the instance recorded by Mr. de Winton, the murder had been committed in ignorance of the species, which, so far as I recollect aright, was designated a Goshawk, *Astur palumbarius*. One had only to take a bird's-eye view of Bishopswood and its surroundings to realise that the district was naturally adapted for periodical visits on the part of the rarer *Raptores*, and I am quite sure that Mr. H. McCalmont, who is a personal friend of mine, and to whom I am writing on the subject, will issue stringent orders that Buzzards and Kites henceforward are not to be molested. The explanation that an undiscerning keeper had shot the Honey Buzzards at

Bishopswood in mistake for Kites, will scarcely mitigate what many will deplore, if only from long time association of a charming species with Selborne Hanger and Gilbert White.—H. S. Davenport (Skeffington, Leicester).

Black-winged Stilt in Norfolk.—On Oct. 17th my son shot a very rare bird, the Black-winged Stilt, *Himantopus candidus*, on the common, about a quarter of a mile from this house. We identified it from the description in Mudie's 'British Birds,' with which it perfectly agrees, and, having ascertained its rarity, forwarded it to Mr. T. E. Gunn, of Norwich, for preservation.—Thomas Moore Hudson (The Manor House, Castleacre.)

[The Black-winged Stilt is perhaps the rarest of all the European wading-birds which visit us in spring and autumn, never remaining here to breed. We have not heard of one for the past fifteen years, if we except a specimen reported (Zool. 1889, p. 387) to have been shot on the Trent near Nottingham, but subsequently shown (Zool. 1890, p. 25) to have been mounted from a foreign skin and fraudulently put forward as a British specimen by an unscrupulous dealer. One of the last recorded was a bird seen in the marshes between Eastbourne and Polegate by the late Capt. Clark-Kennedy on May 6th, 1880. In 1883 these were reported to have been seen near Rye on Sept. 3rd (Zool. 1883, p. 495), but the species was not satisfactorily identified. They may have been Avocets, or possibly Oystercatchers.—Ed.]

Escape of a Caged Eagle.—Under this heading, in 'The Zoologist' for October (p. 380), the fact was announced that a Golden Eagle in the Zoological Gardens at Bristol had contrived by an accident to make its escape. We have since learnt from Mr. H. S. Devonport, of Skeffington, Leicester, that a bird of this species was shot on Oct. 29th in Slate Wood, on the estate of Sir Hugh Cholmeley, Bart., at Easton, and is in the hands of the taxidermist for preservation. This announcement was made in the 'Grantham Journal' of Nov. 9th, where the bird is described as measuring 2 ft. 11 in. in length and 7 ft. 2 in. from tip to tip of wing. General colour a deep brown, mixed with tawny on the head and neck; quills chocolate with white shafts; tail black spotted with ash; legs yellow, feathered down to the toes; bill of a deep blue. Sex male; weight 7 lbs. From the description given by Mr. Devonport of its being seen at Skeffington between Oct. 24th and 28th, when on several occasions it suffered a near approach without showing undue alarm, there can be little doubt that this was the bird which had made its escape three weeks previously.

INSECTS.

Insect Migration.—*A propos* of this subject, discussed in the last two numbers of this Journal, Mr. E. L. Mitford directs attention to the following information, which is given by Miss Gordon Cumming in her entertaining book of travels entitled 'Two Happy Years in Ceylon' (2 vols.

8vo, Blackwood, 1892). At p. 208 of the first volume this writer observes:—"The butterflies of Ceylon are so beautiful and so varied as to be at all times a joy, whether seen singly, when one glorious creature seems for a moment to have the garden to himself, or in companies of radiant joyous little beings. One of the mysteries of the isle is the annual migration in November and December, and at intervals right on to February, of countless myriads of butterflies in vast flights; whence they come and whither going, no one can guess. The migration commences with the setting in of the north-east monsoon, with its cool mornings and bright days; and when the stormy wind blows strongest, these delicate insects, impelled by some inexplicable instinct, force their way against it, and during a couple of months successive legions pass on like an ever-flowing stream. I have collected a few notes of observations made on this subject in different years. Thus, in 1884, swarms of dark-coloured butterflies passed over Kandy and Ratnapura on Nov. 19th. On the following day these were succeeded by swarms of white and yellow ones. In 1887 Mr. Le Mesurier, writing from Nuwara Eliya, noted the first flight of the season on Nov. 18th. The flight lasted the whole day; direction from due south-west to north. Wind from south-west. Colour of butterflies speckled dark brown. The next flight he noticed was on Nov. 21st, when two kinds of butterflies, white and sulphur, continued all day passing right over the summit of Pedro from north to due south. The direction of the wind was from the north-east. On Dec. 10th another observer stated that brown and white butterflies had been in flight for some days, flying south. In 1888 the migration northward in the teeth of the wind was observed at Colombo on Nov. 18th, the great flight of white and yellow butterflies being mingled with some of a darker colour. In 1889 flights were observed in the mountain district of Dimbula, about the middle of October, and at Colombo on Nov. 5th, when dark brown butterflies and yellowish-white ones flew *in separate columns* at a rate of about ten miles an hour. All the accounts (which might be multiplied by observations from all parts of the island, north, south, east, and west, from Manaar to Galle, and from Trincomalee to Negombo) speak only of brown, white, and yellow insects; hence I infer that the glorious butterflies which most delighted us do not risk becoming food for fishes by any such venturesome flights."

Insect Migration.—I notice a correspondent mentions the abundance of *Sphinx convolvuli* on the east coast as being the probable result of migration on the part of this insect. It may be of interest, although scarcely bearing out your correspondent's theory, to note that *Sphinx convolvuli* appears to have been equally plentiful on the west coast of Wales. While staying at Barmouth, during September last, I saw nine of these fine insects caught during two or three nights (five on one night, if I recollect rightly), while hovering over a small patch of tobacco-plants in

front of the house. Two more, at least, were brought into the house by the cat, and probably many more met their fate by the same means. Had the insects been searched for, there is no doubt that a very much larger number might have been secured. Their appearance and condition (excepting those captured by the feline entomologist) was fairly good, and certainly did not look as if they had borne the wear and tear of a sea as well as a land journey. On the other hand, I am not aware that that part of Wales is a recognised locality for this somewhat scarce moth.—S. Prior (25, Aldebert Terrace, Albert Square, S.W.).

REPTILIA.

Adders swallowing their Young.—I consider there can be no further testimony needed to substantiate the long-contested question whether the Adder swallows her young in time of danger than that of Charles Joyce, of Winterbourne Houghton, Dorset. An Adder was seen by Joyce to lower her head, which had been for some time in an erect position, and after resting the lower jaw on the ground, she deliberately opened her mouth, and received her offspring, thirteen in number. With thoughtful precaution, after killing her, he tied a string round her throat, and brought the reptile home, a considerable distance from the wood where it was killed, and in the presence of my tenant he liberated the thirteen young from the dead body of the old one, as lively as when they entered her mouth some hours previously—a distinct proof that they had not entered the actual stomach, otherwise digestion would surely have commenced its disintegrating work.—J. C. Mansel-Pleydell (Whatcombe, Dorset).

FISHES.

Ray's Sea Bream at Scarborough.—On Oct. 19th, hearing that two fisher lads were trying to sell a strange fish, I went in quest of it, but arrived only in time to find it sold. It proved to be a remarkably fine specimen of Ray's Sea Bream, *Brama raii*, measuring 24 inches in length, and weighing 7½ lbs. It had evidently just been brought in by one of the fishing-boats, for it was scarcely dead when I first saw it. It was eventually purchased by Mr. J. W. Woodall, of Scarborough, and forwarded to the Natural History Museum, South Kensington. In Buckland's 'Natural History of British Fishes,' a specimen weighing 4½ lbs. is mentioned as being of unusual size: this was nearly double that weight.—William J. Clarke (44, Huntriss Row, Scarborough).

MOLLUSCA.

The Shell Slug in Scotland.—Mr. William Evans, of Edinburgh, writes to me in reference to a specimen of *Testacella haliotidea* which I recorded from this district as the first one captured in Scotland, that another was found some time ago in Sang's nursery in Kirkcaldy.—Robert Service (Maxwelltown, Dumfries).

NOTICES OF NEW BOOKS.

The Natural History of Aquatic Insects. By Professor L. C. Miall, F.R.S. With Illustrations by A. R. Hammond, F.L.S. 8vo, pp. 395. London: Macmillan & Co. 1895.

A popular interest in Natural History founded upon observation is one of the latest fruits of the revival of learning. During the course of the eighteenth century, the discoveries of Swammerdam and Réaumur slowly made their way into the thoughts of the people, and some acquaintance with the life-history of Insects is now to be counted upon in every reader. The death-like repose of the chrysalis and the emergence of the butterfly, the short life of the winged Ephemera, and the transformation of the Dragon-fly from a sluggish larva lurking in pools to a glorious winged creature flying swiftly through the air, are now among the every-day illustrations of the preacher and moralist, and form a highly characteristic feature of modern literature.

To revive an interest in the writings of certain old-time zoologists—Swammerdam, Réaumur, Lyonnet, and De Geer—whose teaching has been unduly neglected, and to carry on as well as to popularise their work, is the chief object of Prof. Miall's book, and we heartily welcome it as an efficient and instructive guide to those young naturalists who take a delight in observing the structure and habits of living animals.

It was a good idea of Prof. Miall's to begin by telling us what was known of aquatic insects up to a certain point through the teachings of our predecessors above named, explaining their shortcomings and mistakes as viewed by the light of modern research, and then to carry their observations further by completing the life-histories which they had commenced, but had left unfinished. Prof. Miall, in point of fact, has saved the reader a considerable amount of trouble. He has gone through these old volumes, picked out whatever was worth noting, added his own comments in editorial brackets, and brought the information up to date. But he has gone further than this. He has given us the outcome of his own researches, and those of certain fellow-workers, into the *structure* of aquatic insects as correlated with

habit, and the result is a most useful guide to the subject of which it treats, the value of which is enhanced by the original illustrations so carefully drawn by Mr. A. R. Hammond. In these days of rapid production of books, it is refreshing to take up a volume which contains new figures expressly designed for it —figures moreover which really serve their purpose by illustrating the author's meaning, instead of vexing the reader (as so often happens) by not showing the very points on which some elucidation is needed.

The aquatic insects described in this volume have been selected on no philosophical principles. They are merely such as the author has happened to come across in his rambles by pond and stream, or along the coast. But even this chance collection of aquatic species yields interesting results when studied from the right point of view. Prof. Miall describes them in the following order:—Coleoptera, Diptera, Hymenoptera (Ichneumons), Lepidoptera (Moths), Trichoptera (Caddis-flies), Sialidæ (Alder-flies), Perlidæ (Stone-flies), Ephemeridæ (May-flies), Odonata (Dragon-flies), Rhynchota (Water Scorpions), and Thysanura (Springtails).

Especially interesting are his remarks on the "Degrees of Adaptation to Aquatic Conditions," and on the "Wintering of Aquatic Insects" (Introduction, pp. 11, 18). On the latter point the author says:—

> "The common rule is, I think, that aquatic insects winter as larvæ. Nearly all aquatic Diptera, Dragon-flies, May-flies, Stone-flies, and Caddis-flies do this. Occasionally, however, the winged individuals hybernate. Examples are furnished by the Gnat, and one of the Dragon-flies (*Lestes*). Fully armoured species, such as beetles and bugs, commonly pass the winter in the winged state, burying themselves in the mud or in the earth during unusually severe weather. Aquatic insects which have wintered as larvæ usually undergo transformation, and lay their eggs in the following spring. From these eggs a summer generation proceeds, which becomes ready for egg-laying in September, and so the cycle comes round."

In order to study the movements of a Caddis-worm (*Phryganea grandis*) under something like normal conditions, Prof. Miall suggested to a friend, Mr. T. H. Taylor, to supply a naked living specimen with small plates of *mica*, in the hope that a transparent case might be formed. This expectation was fully realised. The creature formed a shapely and sufficiently transparent case

of *mica*, and permitted Mr. Taylor to make some curious observations, of which a summary is given (p. 248). But the entire chapter on Caddis-worms (Chap. V.) is full of interesting details.

Hardly less instructive is the chapter on "Insects of the Sea-shore" (pp. 370–381). When examining, after a day's shore-shooting, the contents of the stomachs of various plovers and sandpipers, which seek their living chiefly between high and low water-mark, we have been at times surprised to notice the quantity and variety of insect life which these birds contrive to pick up on the sea margin, though often so comminuted by the action of the gizzard, as to render identification difficult, and often impossible, the most conspicuous fragments being portions of the hard, horny wing-cases of small beetles. We should have supposed that immersion in salt water would not only have killed these insects, but have rendered them so unpalatable and innutritious as to cause them to be rejected by the birds. But this does not appear to be the case. Prof. Miall says:—

"The saltness of sea-water might be expected to prove disagreeable, if not injurious, to insects, but there is little proof that such is actually the case. Insects, when forcibly submerged, survive about as long in salt water as in fresh. Many are not easily wetted by water. The hairs with which some are covered, and the dense, glossy chitin of others, prevent effectual wetting. The surface film of water will not pass into small openings such as the mouth, or the spiracles, or the spaces between close-set hairs. . . . Packard dredged up live *Chironomus* larvæ in Salem harbour, and not a few dipterous larvæ have been found established in brine-vats. Plateau has drawn up a list of nearly *eighty* species of insects and Arachnidæ which, though they cannot swim, and breathe only gaseous air, inhabit the sea-shore and undergo daily, or at least frequent, immersion."

Some idea of the abundance of insect food which wading-birds find along the shore may be gathered from the remarks which follow. Prof. Miall mentions a number of dipterous and coleopterous species which are found between high and low water-mark, and describes their habits and transformations in a way calculated to awaken the highest curiosity in the reader to make their acquaintance. With such a chapter as this to guide him, no observant naturalist need spend a dull day at the seaside. The concluding chapter in the book deals with what are termed "The Contrivances of Aquatic Insects"—modes of locomotion, methods of capturing food, respiration, and so forth. Attack and

defence call forth yet more contrivances. Protective resemblance, concealment within burrows, by webs, by portable cases, by fixed cases, by the transparency of the body, are a few of the arts practised by aquatic insects, either in self-defence, or as a means of pouncing unseen upon their prey.

"The egg-laying of aquatic insects is attended with special difficulties, some of which spring from the fact that the female fly is in general ill-fitted to enter the element in which the earlier stages have to be passed. These fresh difficulties are met by fresh contrivances. The egg-ropes of *Chironomus*, the egg-raft of the Gnat, the anchoring threads of the eggs of *Ephemera*, the floating cocoon of *Hydrophilus*, are adaptations of peculiar interest, *Dytiscus*, *Notonecta*, *Ranatra*, and certain Dragon-flies, lay their eggs in incisions made in submerged plants. But even these carefully hidden eggs are searched out by such egg-destroyers as *Polynema*, which lay in them their own eggs, from which proceed the parasites which will, in the end, devour their undeveloped host."

One might go on to enumerate fresh contrivances under such heads as the constructions of aquatic insects, the emergence of the winged fly, the defences of resting pupæ, and so on; but the subject is inexhaustible, and it must suffice to refer the curious reader to the book itself from which we have culled these few details. We must, however, make one more extract, and this time from the Introduction. At page 24 Prof. Miall concisely remarks:—

"Aquatic insects make a capital study. While you are looking for one kind, you will come across another. The same methods and the same tackle will do for all. If a young student wants to observe the ways of living creatures, we may recommend aquatic insects to him as an accessible and very imperfectly explored field. He will find plenty of undescribed forms and plenty of beautiful contrivances which no one has ever taken the trouble to observe. But to make out the way in which the exquisite machinery of nature is meant to work is no childish pursuit. The very attempt will lead the naturalist to acquaint himself with scientific laws which seem altogether foreign to Natural History; it will exercise his industry and sagacity; it will extend his knowledge of the possibilities of life."

With these very pertinent remarks we cordially agree.